Claims

1. A circuit for observing data within a shift register without altering said data, said circuit comprising:

a wiring loop connecting the input of said shift register with the output of said shift register; and

a control device connected to said wiring loop, wherein said control device is adapted to use said wiring loop to cause said data to be continually transferred from said output of said shift register to said input of said shift register and through said shift register in a circular manner, and

wherein said control device includes a data output accessible from outside said circuit and wherein said control device outputs data appearing on said wiring loop as said data is circulated through said shift register to permit said data within said shift register to be observed outside said circuit without altering said data within said shift register.

2. The circuit in claim 1, wherein said control device includes a shift register length control unit adapted to limit the circular transfer of data within said wiring loop and said shift register such that all of said data is circulated through said wiring loop a single time, and such that said data is at the same position within said shift register before and after said circular transfer of said data.

3. The circuit in claim 1, wherein said control device includes a storage device adapted to record said data as said data appears on said wiring loop.

4. The circuit in claim 1, wherein said control device includes a write device adapted to change one or more bits of data within said shift register.

5. The circuit in claim 1, wherein said control device includes a shift register length determination unit adapted to send a unique data marker circularly through said shift register and count the number of bits that pass through said wiring loop as said unique marker completes the circular loop through said shift register and returns to said wiring loop and which also includes at least one register adapted to store said result from said counter as a determined shift register length.

6. The circuit in claim 1, further comprising an observation wire connected to said wiring loop, wherein said data passes from said wiring loop to said control device through said observation wire.

7. A circuit for observing data within a plurality of shift registers without altering said data, said circuit comprising:

a plurality of selectors connected to the inputs and outputs of said shift registers, wherein said selectors selectively connect the input of a selected shift registers with the output of said selected shift register to form a wiring loop for said selected shift register; and

a control device connected to said wiring loop, wherein said control device is adapted to use said wiring loop to cause said data to be continually transferred from said output of said selected shift register to said input of said selected shift register and through said selected shift register in a circular manner, and

wherein said control device includes a data output accessible from outside said circuit and wherein said control device outputs data appearing on said wiring loop as said data is circulated through said selected shift register to permit said data within said selected shift register to be observed outside said circuit without altering said data within said selected shift register.

8. The circuit in claim 7, wherein said control device further comprises a shift register selector connected to said selectors, wherein said shift register selector is adapted to cause said selectors to form said wiring loop using one or more different shift registers from said selected shift register.

9. The circuit in claim 7, wherein said control device maintains data on different lengths of said shift registers.

10. The circuit in claim 7, wherein said control device includes a shift register length control unit adapted to limit the circular transfer of data within said wiring loop and said shift register such that all of said data is circulated through said wiring loop a single time, and such that said data is at the same position within said shift register before and after said circular transfer of said data.

11. The circuit in claim 7, wherein said control device includes a storage device adapted to record said data as said data appears on said wiring loop.

12. The circuit in claim 7, wherein said control device includes a write device adapted to change one or more bits of data within said shift register.

13. The circuit in claim 7, wherein said control device includes a shift register length determination unit adapted to send a unique data marker circularly through said shift register and count the number of bits that pass through said wiring loop as said unique marker completes the circular loop through said shift register and returns to said wiring loop and which also includes at least one register adapted to store said result from said counter as a determined shift register length.

14. The circuit in claim 7, further comprising an observation wire connected to said wiring loop, wherein said data passes from said wiring loop to said control device through said observation wire.

15. A method for observing data within a shift register without altering said data, said method comprising:

continually transferring data from the output of said shift register to the input of said shift register and back through said shift register in a circular manner, and

outputting said data as said data is transferred from said output of said shift register to said input of said shift register to permit said data within said shift register to be observed outside said circuit without altering said data within said shift register.

16. The method in claim 15, wherein said process of continually transferring said data is performed for a single data transfer loop such that said data is at the same position within said shift register before and after said process of continually transferring said data.

17. The method in claim 15, wherein said outputting process further comprises storing said data in a memory location separate from said shift register.

18. The method in claim 15, wherein said continually transferring process further comprises altering said data between the time said data is received from said output of said shift register and said data is transferred to said input of said shift register.

19. The method in claim 15, further comprising, before said process of continually transferring said data, determining the length of said shift register by sending a unique data marker circularly through said shift register and counting the number of bits that pass through said shift register as said unique marker completes the circular loop through said shift register and returns to said wiring loop and further comprising storing said result from said counter as a determined shift register length.

20. The method in claim 15, wherein said outputting process directs said data to a location external to said shift register to allow said shift register to be examined by an external device.

21. A method for observing data within a shift register without altering said data, said method comprising:

selecting said shift register from a plurality of shift registers;

continually transferring data from the output of said shift register to the input of said shift register and back through said shift register in a circular manner, and

outputting said data as said data is transferred from said output of said shift register to said input of said shift register to permit said data within said shift register to be observed outside said circuit without altering said data within said shift register.

22. The method in claim 21, wherein said process of selecting said shift register comprises controlling selectors to form a circuit between said output of said shift register and said input of said shift register by connecting a wiring loop between said output of said shift register and said input of said shift register.

23. The method in claim 21, wherein said process of continually transferring said data is performed for a single data transfer loop such that said data is at the same

position within said shift register before and after said process of continually transferring said data.

24. The method in claim 21, wherein said outputting process further comprises storing said data in a memory location separate from said shift register.

25. The method in claim 21, wherein said continually transferring process further comprises altering said data between the time said data is received from said output of said shift register and said data is transferred to said input of said shift register.

26. The method in claim 21, further comprising, before said process of continually transferring said data, determining the length of said shift register by sending a unique data marker circularly through said shift register and counting the number of bits that pass through said shift register as said unique marker completes the circular loop through said shift register and returns to said wiring loop and which also includes at least one register for storing said result from said counter as a determined shift register length.

27. The method in claim 21, wherein said outputting process directs said data to a location external to said shift register to allow said shift register to be examined by an external device.

28. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform a method of observing data within a shift register without altering said data, said method comprising:

continually transferring data from the output of said shift register to the input of said shift register and back through said shift register in a circular manner, and

outputting said data as said data is transferred from said output of said shift register to said input of said shift register to permit said data within said shift register to be observed outside said circuit without altering said data within said shift register.

29. The program storage device in claim 28, wherein said process of continually transferring said data is performed for a single data transfer loop such that said data is at the same position within said shift register before and after said process of continually transferring said data.

30. The program storage device in claim 28, wherein said outputting process further comprises storing said data in a memory location separate from said shift register.

31. The program storage device in claim 28, wherein said continually transferring process further comprises altering said data between the time said data is received from said output of said shift register and said data is transferred to said input of said shift register.

32. The program storage device in claim 28, wherein said method further comprises, before said process of continually transferring said data, determining the length of said shift register by sending a unique data marker circularly through said shift register and counting the number of bits that pass through said shift register as said unique marker completes the circular loop through said shift register and returns to said wiring loop and further comprises storing said result from said counter as a determined shift register length.

33. The program storage device in claim 28, wherein said outputting process directs said data to a location external to said shift register to allow said shift register to be examined by an external device.